Clean Water State Revolving Fund (CWSRF)
Requirements and Guidance
for a
Climate Adaptation Plan (CAP)

DEPLW1278-2015

Maine CWSRF Adaptation Plan Requirements

Starting with the CWSRF Federal Fiscal Year 2015 Intended Use Plan (IUP), the Department will provide an incentive to encourage municipalities and districts to develop a Climate Adaptation Plan (CAP) for their wastewater treatment system. Under this context, the "wastewater treatment system", a.k.a. system, will consist of the municipality's or district's infrastructure assets to collect, convey, treat, and discharge municipal sewage. The incentive will be provided in the form of additional loan principal forgiveness to loan recipients for projects that involve the repair, replacement, or expansion of a treatment works. The amount of the incentive will be established annually during the development of the IUP. The intent of the CAP is for loan recipients to assess the wastewater treatment system's vulnerabilities to climate change and developing a plan for system resiliency.

The climate adaptation plan must be prepared by a licensed engineer and completed and submitted to the Department within **one year** from the loan commitment date.

The **Climate Adaptation Plan** should identify hazards associated with climate change, evaluate their impacts on critical assets, identify adaptation practices, and present recommendations that build resiliency to the critical assets. Some impacts to critical assets will develop slowly over time (sea level rise, air and water temperature changes, precipitation changes, etc.) and other impacts may happen suddenly (storms, tidal surge, ice jams, etc.).

The CWSRF Climate Adaptation Plan shall consist of the following steps:

1. **Identify Participating Personnel:** Consider the key individuals who will be involved with the project. The following list contains some common participants when developing a climate adaptation plan.
    a. Superintendent
    b. Town Manager
    c. Town Planner / Regional Planner
    d. Board of Directors
    e. Consultant
    f. Environmental Engineer
    g. General Public
    h. Select Board

2. **Identify System Hazards:** Identify the hazards and their potential risk to your system. The following list of potential hazards may be applicable to your system. The list is not meant to be all inclusive as additional hazards might be applicable.
    a. Sea Level Rise (examples, inundation of infrastructure, marsh migration as a result of SLR)
    b. Storm surge compounded with SLR
    c. Floods (riverine, flash, inland, urban, coastal)
    d. Increased or decreased seasonal/annual precipitation
    e. Drought
    f. Changes in storm event frequency, duration and intensity
    g. Temperature changes
    h. Energy supply protection
    i. Stronger winds
    j. Accessibility to the critical assets (i.e., during an emergency can you get to the treatment plant, a pumping station, or an emergency generator, etc.)

    Common planning considerations for this task include:
    - Reviewing historic information (example, using information from a previous storm)
    - Projecting future conditions of the climate:
        - How far in the future should you plan for?
        - Use future climate change estimates / projections of temperature and precipitation that correspond with your plan, or the life of the asset in consideration.

3. **Identify Vulnerable Assets & Determine Consequences:** Evaluate the critical assets of the treatment system to determine their vulnerability to the identified hazards, e.g. determining elevations of assets, locations of asset, etc. Develop a characterization of consequence and likelihood for each hazard. Determine the possible impacts to the assets and the resulting consequences, e.g. equipment damage, service interruption, etc.

4. **Identify and Evaluate Adaptation Practices:** Identify possible short and long-term adaptation practices for the vulnerable critical assets. These could be a change in operating procedures or practices that may or may not include a capital expense. Estimate the costs to reduce or eliminate the critical assets' vulnerability to the hazard. Prioritize the resiliency options based on their effectiveness, cost, and practicality to implement. Make a recommendation as to the adaptation practices that are appropriate for each vulnerable critical asset.

5. **Develop Implementation Plan:** Develop a plan to implement the recommended adaptation practices to reduce damage to equipment or interruption to service. If implementation of the recommended measures requires a capital expense, it should be integrated into the utilities' asset management plan.

6. **Submit CAP:** The Climate Adaptation Plan shall be submitted to the Department for review and approval.

Key Terms and Definitions:

Definitions were taken from the US Environmental Protection Agency, Glossary of Climate Change Terms (http://www.epa.gov/climatechange/glossary.html). An additional source is also referenced that was used for the definition of 'Risk Assessment'.

TERM	DEFINITION
Adaptation	Adjustment or preparation of natural or human systems to a new or changing environment which moderates harm or exploits beneficial opportunities.
Climate	Climate in a narrow sense is usually defined as the "average weather," or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands of years. The classical period is 3 decades, as defined by the World Meteorological Organization (WMO).
Resilience	A capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment.
Risk Assessment	Studies that estimate the likelihood of specific sets of events occurring and their potential positive or negative consequences.
	GlobalChange.gov http://www.globalchange.gov/climate-change/glossary
Vulnerability	The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed; its sensitivity; and its adaptive capacity.

References:

The following resources are listed for reference only and are not meant to be an endorsement or requirement of a particular method for the climate adaptation plan development.

- Department of Environmental Protection Climate Change Webpage, http://www.maine.gov/dep/sustainability/climate/index.html
  Contains Maine Climate Change Adaptation Toolkit – A centralized source of information to integrate into designing and implementing adaptation practices.
- Maine's Climate Future – 2015 Update, http://cci.siteturbine.com/uploaded_files/climatechange.umaine.edu/files/MainesClimateFuture_2015_Update2.pdf

- Department of Agriculture, Conservation and Forestry Coastal Hazard Resources, https://www.maine.gov/dacf/mgs/hazards/coastal/index.shtml

  Contains information and mapping tools for Maine's Highest Annual Tide, Sea Level Rise / Storm Surge, Marsh Migration, Potential Hurricane Inundation, and Maine FEMA Floodplain Maps.

- Samples of Sea Level Rise Modelling:
  - Midcoast, http://midcoastcog.org/projects/coastal-hazard-resiliency-sea-level-rise/
  - Washington County, http://gro-wa.org/washington-county-climate-change-response.htm#.VeCYniVVgSV
  - Lincoln County, http://lcrpc.org/sea-level-rise-scenarios
  - Casco Bay (wetlands), http://www.cascobayestuary.org/resources/publications/2013-sea-level-rise-and-casco-bays-wetlands-reports/
  - Saco Bay, http://smrpc.org/images/SLAWG/Background_Reports/VulnerabilityAssessmentText05-04-2011.pdf
- FEMA's Flood Map Service, https://msc.fema.gov/portal
- EPA New England Regional Climate Adaptation Plan, New England Regional Climate Adaptation Plan
- Being Prepared for Climate Change – A workbook for Developing Risk-Based Adaptation Plans, http://www2.epa.gov/sites/production/files/2014-09/documents/being_prepared_workbook_508.pdf
- Flood Resilience Guide – A Basic Guide for Water and Wastewater Utilities, http://water.epa.gov/infrastructure/watersecurity/emerplan/upload/epa817b14006.pdf

  Contains Berwick, ME Water Department Treatment Plant Flood Resilience Project

  - Berwick, ME Case Study - Flood Resilience Guide - VIDEO
- Climate Resilience Evaluation & Awareness Tool (CREAT), http://water.epa.gov/infrastructure/watersecurity/climate/creat.cfm
- Adaptation Strategies Guide for Water Utilities, http://water.epa.gov/infrastructure/watersecurity/upload/epa817k15001.pdf
- Department of Homeland Security – Climate Change Adaptation Roadmap, http://www.dhs.gov/sites/default/files/publications/Appendix%20A%20DHS%20FY2012%20Climate%20Change%20Adaptation%20Plan_0.pdf
- U.S. Climate Resilience Toolkit, https://toolkit.climate.gov/get-started/overview